AMERICAN JOURNAL OF PHARMACY

PUBLISHED MONTHLY BY THE

Philadelphia College of Pharmacy

VOL. 89 — SEPTEMBER, 1917 — No. 9

CONTENTS

Price, $3.00 per Annum, in advance. Issued in Monthly numbers of not less than 48 pages. Single Numbers, 30 Cents. Back Numbers, 50 Cents.

Address all communications to
The American Journal of Pharmacy, 41 North Queen Street, Lancaster, Pa., or 145 North Tenth Street, Philadelphia, Pa.

Entered as second-class matter February 14, 1917, at the Post Office at Lancaster, Pa., under the Act of March 3, 1879.

American Journal of Pharmacy

ESTABLISHED IN 1825

Four preliminary numbers were published at different times until in 1829, when the publication of the regular volumes began. Since then the publication has been uninterrupted. During the period from 1829 to 1852 four numbers were published annually, except in 1847, when five numbers were published. From 1853 to 1870 six numbers were published. Since this time twelve numbers have been published annually.

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	2 pp.	4 pp.	8 pp.	16 pp.
25 copies	$2.25	$3.75	$7.75	$9.00
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100 "	2.75	4.25	9.00	10.75
250 "	3.75	4.75	10.00	12.00

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THE AMERICAN
JOURNAL OF PHARMACY

SEPTEMBER, 1917

PLANT TEXTURES—"CONSIDER THE LILIES."[1]

By John Uri Lloyd, Phar.M., Cincinnati, O.

"Consider the lilies of the field, how they grow; they toil not, neither do they spin; and yet I say unto you, that even Solomon in all his glory was not arrayed like one of these."—Matthew 6: 28, 29.

The Lily.—In this text the great Wisdom Master challenged not Solomon alone, but whoever sat in high places. And if in his estimation the mighty ruler, Solomon, was humbled in comparison with the tiny lily of the field, one might ask, who in worldly power can presume to glorify himself?

Through the passing centuries the artistic beauty of the modest lily of the field has ever brought confusion to the wearer of gorgeous raiment. Clad though he be in purple and gold, vainly does the potentate compete with a tiny plant that comes and goes in the solitude of a grass bound meadow.

While the lily as a whole, in its simplicity of leaf and the modest charm of its drooping, tiny white bells, bids even royalty be humble in its presence, we unconsciously accept that the Master's eulogy applies to beauty of blossom, of form, color and surface, only. Can our views not be enlarged? Is this limitation just?

Let us pass now to another Wisdom Book of the past, taking therefrom the text,

> "All things are ceaselessly active; no man can enumerate all,
> Nor can all be seen by the eye."[2]

[1] No claim is made herein to originality of facts. Taking for our text a tiny plant, our aim is but to lead thought in an informal way, step by step, to the immensity of the subject. But, for want of space, a fraction, only, has been introduced of the possible opportunity afforded by this plant. Inasmuch as the subject appeals both to pharmacy and medicine the author reserves the privilege of presenting the paper to readers in both fields.

[2] The Book of Ecclesiastes, by Paul Haupt. Johns Hopkins Press, 1906.

Hidden Charms.—Within the crown of each tiny cup on the spike of the lily of the valley,[3] rests a structural marvel in which, in miniature, stamens and pistil are arranged in perfect symmetry, hidden from the casual observer. Resting in the shadows cast by the embracing leaves, content are the tiny bells to face, ever, the earth. Not one looks upward into the glare of the sun. Typical of modesty are they in that their hidden charm needs be sought by him who aims more fully to comprehend the Wisdom lesson given so many centuries ago.

Shall thought be restricted to floral beauty alone? Does not the Master's injunction, "Consider the lilies of the field, *how they grow,*" include more than this? Are we not bidden to look beyond that which meets the eye?

"How They Grow."—But for the humble, hidden earth stem (the rhizome), there could be neither leaf nor blossom. "In all its glory" the plant must depend for its bud and flower upon its earth-covered support. Creeping in darkness, content to do its part unseen, the root draws from the cold earth moisture and nourishment for the support of the structure that, in the breezes of heaven, enjoys the sunlight and the shade. When we consider "How they grow," the earth stem is all important.

Its Micro Lace Work.—Comes next to thought a questioning as to what lies beneath the skin, whether it be of root, leaf or flower. And in this questioning should we not also include the skin as a textural part of the whole? Does not the thinnest section of the plant of whatever part examined under the microscope disclose a network so exquisite as to eclipse even the beauty of the flower? So delicate is this as indeed, by contrast, to make even the flower-bell a clumsy piece of mechanism. In its tiniest fragments each portion of the plant presents a wonder-world to him who views this maze of the infinitely little. And as our viewpoint changes does not the scene shift? If the micro-slice be transversely made one phase of this exquisite mechanism is disclosed; if diagonal, another; if lengthwise, still another; each not less entrancing than the others.

"A mighty maze, but not without a plan."

And now comes to him who views such as this the marvel of it all. Perfect harmony in contexture exists between like sections of

[3] This I accept to be the "Lily of the Field" of our text.

separated plants, be their home near or far, on mountain, plain or valley. Built of one pattern each yet carries in itself a distinct individuality. Nor is this all.

Wonders in Cell Life.—Pass that which can thus be seen, whether by the unaided eye, or in its micro-networks of lace. Are there not yet finer lines? Turn to the minute cells that make the lace-fibers. Each in itself constitutes an interlaced complexity. Behold them, in groups or singly, whether moving freely in the plant blood, or securely locked within the tissues. Beautiful structures are they, some transparent almost as water to the ordinary microscope, others shaded or colored green. Do not these tiny structures make possible the lily's growth? As they come and go, spring into existence, become fixed or burst and die, is not the plant guided to maturity from root to flower? Born into life but to die, their birth and death create and support the creature as a whole, that in turn gives to each transient cell a home in which to have its being and then pass away, much like the coral insect that makes of the masonry it builds, its tomb. Who that views these cell groups, too numerous for computation, too intangible in their development for human comprehension, too mysterious in their activities for the grasp of man's intellect, can but question further possibilities? Each cell is in itself a community of activities. Within it we discover structures such as nuclei and protoplasmic masses, each being a home in miniature in which the dwellers are as interlaced entities that play well their part. Can there be further wonders? Are there recesses yet to be explored? Did not Milton write:

"And in the lowest deep a lower deep?"

Life Points.—Grind to a pulp the living plant or any part thereof.[4] Gone are leaf and flower and root. Burst the cells, mix their contents. Squeeze from the texture of the plant the juice that once coursed freely in its veins and rested in its cells, then filter. To the eye it is but as water; to the microscope that brought to view what we have previously seen, it is transparent and limpid. No cell, no fragment of material of any kind is visible.[5]

[4] To cover and digest with water a few fresh slices of any part of the plant is as satisfactory a process.

[5] In a lecture in 1890 before the New York College of Pharmacy, titled, "Infinities in Pharmacy," I attempted to indicate the relationship that existed between vegetable structures and manipulative processes. In this I emphasized coming possibilities, using this sentence: "Yet we know not what infinity of other results is possible to other forms of manipulation."

Turn now to the ultra microscope. Perfect transparency of solution by means of other light and methods here becomes as darkness. Focus the instrument in its highest power, in the bright illumination of the arc light on a film of distilled water. Absolute darkness prevails. Use next a film of this transparent juice of the lily of the field. Behold, a multitude of tiny, dancing points of light, each twinkling and revolving as though circling, planet-like, in an orbit of its own. Let us consider some phases of what now lies before us.

Stars of the Infinitely Little.[6]—So thin is the layer of juice in which these starry points appear, a mere film between two glass planes, that but for it they would rest upon each other. Yet so deep is it to the eye of the ultra microscope as to be in comparison a swirl of currents and eddies, much like a whirlpool in a lake. In this spin the tiny, glittering, diamond-bright points, possessed of motion of their own—an ever constant, twinkling whirl. They move where flows the current, which to them is a mælstrom. Ever active are they in their orbits, but, unlike bacteria, they have not power to resist the ocean in which they float. Comparable are they with the "star dust" of space. As in the "immeasureable great" the stars of heaven become brighter as the power of the telescope increases, so these tiny points, in the "infinitely little," twinkle more brightly as the power of the microscope increases. So very minute are they that to focus those on the surface of the film is to lose those beneath. To bring to view those beneath the surface is to pass successively myriads that lie in the film's depths. So numerous are they that although the field is but a pin-section magnified to the size of a dime, these sparkling, gyrating points are seemingly as numerous as before the telescope are the stars in the heavens.

Perpetual Motion.—Comes now the greatest marvel of it all. Never do these microscopic entities, in their natural setting, lose their motion. Preserve a portion of the juice and turn to it from time to time. Still do they whirl, twinkle, move on their axes. Death seems not to be their part. Almost might one accept that the molecule of life activity has here been revealed. The life spirit inherent in the minuteness of dead matter has seemingly been disclosed.

[6] No claim is made to the discovery of the "Brownian Movements," now so familiar to those concerned in physical chemistry. Our aim here is but to adapt these, as a link, to this story of the lily of the field.

Who would venture to presage the part that these vitalized ultimates, compared with which a microscopic cell or a bacterial segment is of mammoth proportions, take in the life functions that build the lily of the field?[7]

The Half Not Told.—Have we searched the innermost crypts, even now possible, in this attempt to present the story of the lily of the field? Let us ask. Have we herein mentioned the alchemy that creates either the exquisite perfume exhaled by the flower, or the active, toxic alkaloid contained in its structural root? Have we directed thought to the green pigment of the leaf or to the processes of the active cells that, in the sunlight, give to its verdure paint a useful setting? Have we considered the *function* of the pigment so essential to vegetable life? Have we noted the formation or function of dissolved juice content, such as sugar, or of cell content, such as acid or astringent? Have we attempted to show how "inorganic" becomes "organic" in the metamorphosis that forms this life tissue? Have we ever ventured to ask what lies in the transparent serum in which the star dust of micro-infinities dances, unseen by the eye even of the ultra-microscope, evasive to the most sensitive chemical reagent? Have we not ample reason to rest content in what is mentioned, accepting that "enough is enough?" May we not conclude that, in any study yet made of any plant of the myriads known, when one considers the possibilities outside our present limits, "the half has not been told?" Again let me quote from *"Infinities in Pharmacy."*

"Painful as the admission may be we stand dumb before the mystery of the simplest plant in its living entirety."

[7] There are persons who view such studies as these as unnecessary to pharmacy. Likewise, there are those who consider plant pharmacy to be but a "rule of thumb" process in which the crudest churl stands shoulder to shoulder beside the deepest student.

THE CRUCIAL TEST OF THERAPEUTIC EVIDENCE.[1]

By Torald Sollmann, M.D., Cleveland.

According to the good old truism, the last and crucial proof of the pudding is in the eating thereof; and so, the last and crucial test of a therapeutic agent is its consumption by a patient. There is, however, one essential difference: When the pudding is eaten, with a sense of satisfaction, we know that it was good, or at least an eatable pudding.

If the patient improves after taking a remedy, we do not yet know that he improved on account of the remedy. The *post hoc* type of reasoning or logic is not respectable; but it is all too apt to creep in unawares, unless one takes great precautions indeed.

Clinical evidence needs especially to be on its guard against this pitfall, for the conditions of disease never remain constant; nor is it possible to foresee with certainty the direction which they are going to take. It is just this point which makes the clinical evidence so much more difficult to interpret than laboratory evidence, in which the conditions can be more or less exactly controlled, and any changes foreseen. It is on this account, also, that clinical experiments must be surrounded with extra painstaking precautions.

In brief, while the "proof" of a remedy is on the patient, that is not the whole story, but merely an introduction. The real problem is to establish the causative connection between the remedy and the events. The imperfect realization of this has blocked therapeutic advance, has disgusted critical men to the point of therapeutic nihilism, and has fertilized the ground for the commercial exploitation of drugs that are of doubtful value or worse.

This has been impressed on me particularly by my service on the Council on Pharmacy and Chemistry. In the course of its work of passing on the claims advanced for commercial remedies, this council is forced to inquire critically into the basis of the claims of manufacturers.

It is interesting to note the qualitive differences in the evidence for the various kinds of claims: The chemical data are usually

[1] Read before the Section on Pharmacology and Therapeutics at the Sixty-Eighth Annual Session of the American Medical Association, New York, June, 1917, and reprinted from the *Journ. A. M. A.*, July 21, 1917, pp. 198, 199.

presented in such a form that it is possible to tell at a glance whether or not they are based on demonstrated facts, which could usually be verified or refuted without special difficulty. The deductions are usually such as can be legitimately drawn from the data, or else they are obviously absurd. All this agrees with the relatively exact status of chemical science.

In passing to data and deductions from animal experiments, a distinct change is noticeable: Not only are the data less reliable, and less worthy of confidence, but they are more often stated in a less straight forward manner. The presentation of the data often shows evidence of manipulations of the results, so as to make them most favorable to a preconceived conclusion that would recommend the drug. This is not always intentional, but is partly due to the less exact nature of animal experimentation, which leaves a wider play to the arbitary interpretation of the reporter. A certain amount of this is unavoidable. No serious objection can be raised, provided the experimenter presents all the essential data, and discusses fairly all of the interpretations that would apply to them.

On the whole, it is usually possible to form a fairly definite estimate of the value of experimental data.

When one comes to the clinical evidence, an entirely different atmosphere obtains. When the Council demands evidence of the usefulness of a remedy, the manufacturers generally respond with every sign of enthusiasm. They may have ready a series of articles already published, or they instruct their agents to bring in letters from physicians. The last method seems to meet the most cordial response, judging from the deluge of letters and opinions that floods the Council.

The quality of the published papers is a fair reflection of the deficiencies of what is still the common type of clinical evidence. A little thought suffices to show that the greater part cannot be taken as serious evidence at all. Some of the data are merely impressions —usually the latest impressions of an imperssionable enthusiast— the type of man who does not consider it necessary to present evidence for his own opinions; the type of man who does not even realize that scientific conclusions must be based on objective phenomena.

Some of the papers masquerade as "clinical reports," sometimes with a splendid disregard for all details that could enable one to judge of their value and bearing, sometimes with the most tedious

presentation of all sorts of routine observations that have no relation to the problem.

The majority of reports obtained by the agents belong to these classes, notwithstanding the fact that they are often written for the special use of the Council, and therefore with the realization that they are likely to be subjected to a thorough examination, and therefore presumably representing the best type of work of which the reporter is capable. So, at least, one would suppose.

It is also possible, however, that some of these reports are written merely out of thoughtlessness, or perhaps often to get rid of an importunate agent. This is illustrated by the following correspondence, taken literally from the files of the Council.

A letter from a prominent physcian "A," endorsing a certain preparation "D," having been submitted to the Council, the secretary was directed to write to Dr. A as follows:

"*Dear Dr. A:*—The B Company of C has requested the Council on Pharmacy and Chemistry to admit its preparation D to New and Nonofficial Remedies. As part evidence for the value of the preparation, the company submitted a letter from you which contains the following:

"So far as my experience has thus far gone, they are certainly superior to a number of other iodin compounds now on the market, and I should judge that they ought to take a superior place in therapy involving the use of iodin.

"The referee of the Council in charge of D writes that he was interested by your letter and asks that I inquire: As compared with sodium or potassium iodid, what would you say are the differences between, and real advantages of, D and the alkaline iodids? Did you make any comparative experiments and keep a record of them? If so, the referee would like to receive an account of your trials. In what direction could D be expected to occupy a superior place in iodin therapy?

"I hope that you can give the information asked by the referee and thus aid the Council in arriving at a correct estimate regarding the value of D."

The following reply was received from the physician in response to the foregoing:

"*Dear Professor Puckner:*—In reply to yours of January 19, I did not proceed far enough in the investigation of D to draw conclusions of any particular value for the purpose of the Council on Pharmacy and Chemistry; and I so stated in my letter to the proprietors of that remedy.

Answers to the questions you put in your letter require an amount of investigation of the remedy far beyond anything I undertook. As a matter of fact, I returned about five sixths of the capsules sent me, because of lack of time and opportunity to carry out the extensive clinical experiments that I plainly saw would be required to give an opinion at all worth while. I believe you had better not consider me in the matter at all."

The report was furnished by a physician for whom I have a high personal regard. I introduce it here, not so much in a spirit of criticism, but as a justification of the opinion that I have formed of clinical evidence obtained by manufacturers through their clinical adjutors.

When commercial firms claim to base their conclusions on clinical reports, the profession has a right to expect that these reports should be submitted to competent and independent review. When such reports are kept secret, it is impossible for any one to decide what proportion of them are trustworthy, and what proportion thoughtless, incompetent or accommodating. However, if this were done it is quite possible that such firms would find much more difficulty in obtaining the reports. Those who collaborate should realize frankly that under present conditions they are collaborating, not so much in determining the scientific value, but rather in establishing the commercial value of the article.

Often the best type of clinical reports—those in which the observations are directed to the significant events and not to mere side lines, and in which the significant events are correctly and adequately reported—generally lack one important essential, namely, an adequate control of the natural course of the disease.

Since this cannot be controlled directly, it must be compensated indirectly. For this purpose, there are available two methods:

The first is the statistical method in which alternate patients receive or do not receive the treatment. This method can usually only be of value when a very large series of patients is available. Even then, its value is limited or doubtful, because it cannot take sufficient account of the individuality of cases.

The second method consists in the attempt to distinguish unknown preparations by their effects—the method that might be called the "comparative method" or the "blind test."

In this, the patient, or a series of patients, is given the preparation which is to be tested, and another preparation which is inactive, and the observer aims to distinguish the two preparations from their effects on the patient. Surely if the drug has any actions at all, it will be possible to select correctly in a decided majority of the administrations.

The same principle can be applied in distinguishing the superiority of one preparation over another. In this case, the two preparations would be given alternately to different patients, and the ob-

server would try to distinguish them by their effects. Here again, if one drug is really superior or otherwise different from another, to a practical important extent, the observer will surely be able to make the distinction.

This method is really the only one that avoids the pitfalls of clinical observation; it is the only method that makes the results purely objective, really independent of the bias of the observer and the patient. It is the only method, therefore, which determines whether it was really the pudding that was eaten and not some other dessert.

In principle this method does not usually offer any very great difficulties. It is, of course, necessary that the two preparations to be compared shall resemble each other so closely or shall be flavored, etc., so that they cannot be distinguished by their physical properties. This is usually not a very difficult matter. The method does not jeopardize the interests of the patient, for it is understood that no drug would be tested in this way unless there is some reason to believe that it has a value. When the patient's condition is such as to demand treatment, then he would be receiving either the standard drug or the drug which the experimenter believes may be superior to the standard.

Conclusions.

The final and crucial test of a remedy is on the patient; but the test must be framed so as to make it really crucial. Most clinical therapeutic evidence falls far short of this. The "blind test" is urged to meet the deficiencies.

CARREL-DAKIN SOLUTION.[1]

By John K. Thum.

It was while working on native black oxide of manganese, which chemical investigators before Scheele had studied more or less unsuccessfully, that he discovered in short order four new substances —chlorine, oxygen, manganese and baryta—and of these four, the first two have undoubtedly been of the utmost importance for the

[1] Reprinted from the *Journal of the American Pharmaceutical Association*, Vol. VI, No. 5, May, 1917.

proper understanding of chemical processes. This happened in 1774. Scheele termed the first substance "oxymuriatic acid"; thirty-seven years later, Sir Humphry Davy classified the first of these substances as an element and gave it the name "chlorine." Although Gay-Lussac and Thénard were the first to suggest that from its behavior it might be regarded as an element, Davy proved it.

The practical value of this discovery and the important rôle that chlorine has played in the development of chemistry cannot be overestimated, and now that its value as a germicide has been proved and its practical application made possible by the researches of Carrel, the danger of death from infection has been wonderfully reduced. Knowledge of the disinfecting and germicidal action of chlorine is not by any means recent. Chlorine water has been recommended for years locally as a stimulant and disinfectant for wounds and ulcers. However, its irritating nature and the severe pain produced when applied to wounds has militated against its general use in surgical procedure. Some years ago it was discovered that very attenuated solutions of this gas were efficient for the sterilization of swimming pools, but its use for this purpose has been discarded for the copper sulphate treatment of the water. Like in everything else the personal equation plays a very important part in the handling of chlorine gas for the disinfection of a swimming pool; while one man would exercise great precaution and care in carrying out the technic for the treatment of the water, others would be rather lax in varying degrees, with the result that while the water would probably be thoroughly sterilized, it would also be exceedingly irritating and painful to the eyes. In the copper sulphate treatment of the water this condition is not so prone to occur.

It may be of interest to know that as early as 1846 the disinfecting properties of chlorine were proven by the successful employment of it in eradicating an epidemic of puerperal fever in Vienna. In this case bleaching powder was used. Undoubtedly the ideal germicide for combating infection that occurs in most wounds is one that has the power of destroying not only bacteria but spores as well, and is only local in its action and, therefore, without danger to the host. It seems that the hypochlorites have this power. As a matter of fact they have been recognized by public health workers as the most potent germicides that we have, and yet their use in general surgery has been limited for reasons that are

obvious. The various hypochlorite solutions are all more or less unstable as to chlorine content and, while they can be made more stable by making them more alkaline, this militates against their use on the tissues.

The first practical application of chlorine in surgical procedure for the eradication and control of infection was undertaken by British surgeons shortly after the beginning of the great war. They immediately recognized their helplessness when the large number of wounded began to arrive from the front with wounds of every description and all terribly infected. They worked with hypochlorous acid in one-half per cent. aqueous solution, made by adding 12.5 grammes of chlorinated lime and the same quantity of boric acid to a liter of distilled water and allowing the mixture to stand over night. This was then filtered and used as a surgical dressing. In the *British Medical Journal,* July 24, 1915, p. 129, they give their results; while these are good, other workers seem to have been unable to duplicate them.

In their experiments they failed to take into account the extreme variability of chlorinated lime and this may be the main reason why results have been unsatisfactory in different workers' hands.

Dakin's solution then made its appearence. This is now referred to as Dakin's Original Solution. This solution is very easily made: 140 grammes of dried sodium carbonate are dissolved in 10 liters of water, and 200 grammes of chlorinated lime are added; the mixture is well shaken at intervals during one hour; the supernatant liquid is then siphoned off and filtered, preferably through paper. This solution is somewhat alkaline, but this alkalinity is modified by the addition of 40 grammes of boric acid. This preparation however, did not prove altogether satisfactory. Sometimes it worked admirably and at other times not. There were times that patients complained that the solution was very irritating and painful, although the original technic followed in its manufacture was always scrupulously duplicated. Of course, the fault laid with the chlorinated lime. While the formula was always rigidly adhered to, the chlorinated lime seldom had the 25 per cent. chlorine content that was required to make a 0.5 per cent. solution. When one remembers that the different brands of chlorinated lime available in the open market vary considerably, and that even different packages of the same brand will run all the way from 25 to 35 per cent. in available chlorine content (at least that was the range found by us

of packages put up in this country, and in Europe it must be greater, as the range of chlorine content of packages bought on the open market there run all the way from 20 to 37 per cent.), it is perfectly obvious as to why results should be so variable in different surgeons' hands.

Now Dr. Carrel's method for combating infection is simply a more or less continuous irrigation of the wounds with a modification of Dakin's solution, or, to be more exact, a modification of the well-known Labarrque's solution, officially known as *Liquor Sodæ Chlorinatæ*. This official solution of sodium hypochlorite contains 2.5 per cent. of available chlorine and is markedly alkaline. This makes its use as a dressing for infected wounds prohibitive, it being exceedingly irritating and painful. Dilution of this solution with water to reduce it to 0.5 per cent. of available chlorine (the strength of the Carrel-Dakin solution) is impracticable, as it is still too alkaline. Such a diluted solution, first neutralized by the addition of boric acid, has been used but with very unsatisfactory results, it rapidly losing its chlorine, and proving otherwise objectionable.

Of course, making the preparation in this manner simplifies matters very much and also saves time, a factor of some importance where large quantities must always be available. It was Daufresne who pointed out the disadvantages of neutralization with boric acid, to which he attributed much of the irritation and painfulness, and the extreme variability of the chlorinated lime was also noted by the same observer.

Naturally, this illuminating fact put an entirely new aspect on the matter and brought forcibly to mind that estimation of the chlorine content of each new lot of chlorinated lime was absolutely essential before concordant results could follow.

Accordingly Daufresne evolved the following technic for making this preparation, and this only, and no other, should be used when Dakin's or Carrel-Dakin solution is called for:

Chlorinated lime (25 per cent. chlorine)	184 Gm.
Sodium carbonate, dried	92 Gm.
Sodium bicarbonate	76 Gm.

Into a 12-liter bottle put the chlorinated lime and five liters of water and shake frequently during a period of six hours; dissolve the two sodium salts in five liters of water and after six hours add this solution to the mixture of chlorinated lime and water and shake

well for several minutes. Allow to stand for at least half an hour until reaction is complete and then siphon off the supernatant liquor and filter through paper. The solution, undiluted, is then ready for use.

When the chlorine content of the chlorinated lime is above or below 25 per cent., the proportions of the three ingredients entering into this solution must be increased or reduced accordingly. To avoid the necessary calculation that this entails, Daufresne has prepared the following table:

QUANTITIES OF INGREDIENTS FOR TEN LITERS OF DAKIN'S SOLUTION

Titer of Chlorinated Lime.	Chlorinated Lime. Gm.	Anhydrous Sodium Carbonate, Gm.	Sodium Bicarbonate. Gm.
20	230	115	96
21	220	110	92
22	210	105	88
23	200	100	84
24	192	96	80
25	184	92	76
26	177	89	72
27	170	85	70
28	164	82	68
29	159	80	66
30	154	77	64
31	148	74	62
32	144	72	60
33	140	70	59
34	135	68	57
35	132	66	55
36	128	64	53
37	124	62	52

It would be well to take the titer of this solution occasionally. The same substances used for determining the activity of the chlorine in the lime are used for this purpose.

To ten mils of the finished solution add 20 mils of 10 per cent. solution of potassium iodide and 2 mils of acetic or hydrochloric acid. Measure into this mixture, drop by drop, from a burette, a decinormal solution of sodium thiosulphate until decoloration is complete. The number of mils used multiplied by 0.03725 will give the weight of the sodium hypochlorite in 100 mils of the preparation.

In order to determine the alkalinity of the Carrel-Dakin solution or note its freedom from caustic sodium, add to 20 mils of the solution 0.02 of phenolphthalein; if correctly prepared no red coloration should appear.

Estimation of the amount of chlorine in the chlorinated lime is of the utmost importance and the method for doing this is simplicity itself. One may use the method given in the U. S. Pharmacopœia, or the following, which is the one mentioned by Carrel in his note to the *Journal A. M. A.*, December 9, 1916, p. 1777, and which note is printed in the *American Journal of Pharmacy*, February, 1917, p. 84:

"Weigh out 20 grammes of the average sample, mix it as completely as possible with 1 liter of ordinary water and leave it in contact for a few hours, agitating it from time to time. Filter.

"Measure exactly with the gaged pipette 10 mils of the clear fluid; add to it 20 mils of a 1:10 solution of potassium iodide and 2 mils of acetic or hydrochloric acid. Drop a drop at a time into this mixture a decinormal solution of sodium thiosulphate until decoloration is complete.

"The number of mils of the thiosulphate solution required for complete decoloration, multiplied by 1.775, gives the weight of the active chlorine contained in 100 grammes of the chlorinated lime."

A WELL-EQUIPPED COLLEGE OF PHARMACY.

By Henry Kraemer.

Pharmacy, like every other profession, requires for its just recognition by the public at large that all of its educational institutions shall be properly manned and fully equipped with everything that will make for the highest development of pharmacy at the present time. While this is true, the only way that this uniform progress can be attained is by the signal advancement of either some one school or college as a whole, or some one of their departments. There is no question but that the progress in one school is advantageous to every other, as every other school is desirous of not being found lagging. I think that this broad spirit characterizes educators in their work. He who would begrudge any institution of its having attained preëminence and a vantage point which is deserving of the felicitations of the best men and women shows a mean spirit and is not deserving of a place among the world's educators. It was with a great deal of satisfaction that I visited the College of Pharmacy of the University of Minnesota last winter, and saw its

new building, excellent laboratories and splendid equipment. It is now little more than twenty-five years ago that the dean of this college and I were associated as instructors in the College of Pharmacy in the City of New York. He at that time was an earnest student, filled with visions of a higher pharmacy and was called to build up the department of pharmacy of the University of Minnesota. It is always a source of satisfaction to see visible expressions of the fact that the dreams of a young man will come true, providing he works. Dean Frederick J. Wulling has labored hard and successfully and at the prime of life, with many years ahead of him, has an institution which is the equal of that of the best professional and technical schools anywhere. He has associated with him a group of men who will support him and will demonstrate to the regents of the University of Minnesota that their confidence in him has not been misplaced and that professional pharmacy is deserving of this support.

The new buildings were completed in 1913 and since that time the college has continued to grow. The pharmacists of the Northwest are to be felicitated that they have an institution of pharmaceutical learning that is adequately equipped and stands in the very front line of institutions of its kind in the world. From six students in 1892 with no fixed entrance requirements to over one hundred students in 1917, practically all four-year high-school graduates; from the meager appropriation of $5,000 in 1892 to an appropriation of $75,000 in 1911; from a property value of about $2,000 in 1892 to a property value (personal and real) of over $300,000, inclusive of sites, in 1911; from a few instructors in 1892 to an active working faculty of twenty-seven, with every member of which every student comes in contact; from no special lecturers in 1892 to fourteen in 1911; from a single room in which lecture and laboratory work was carried on in 1892 to a fine large four-story building, 61 x 115 ft. in dimensions, in the erection and remodeling of which for the College of Pharmacy over $100,000 has been spent up to the present; from a fairly good curriculum in 1892 to one which is comparable with the best now; from comparatively little research work in 1892 to a fair volume of such work now; from an attempted medicinal plant garden in 1894 to a real drug garden of several hundred medicinal plants and to a plant house 31 x 60 ft., devoted to economic plants; from a precarious existence within the few years following organization, during which period

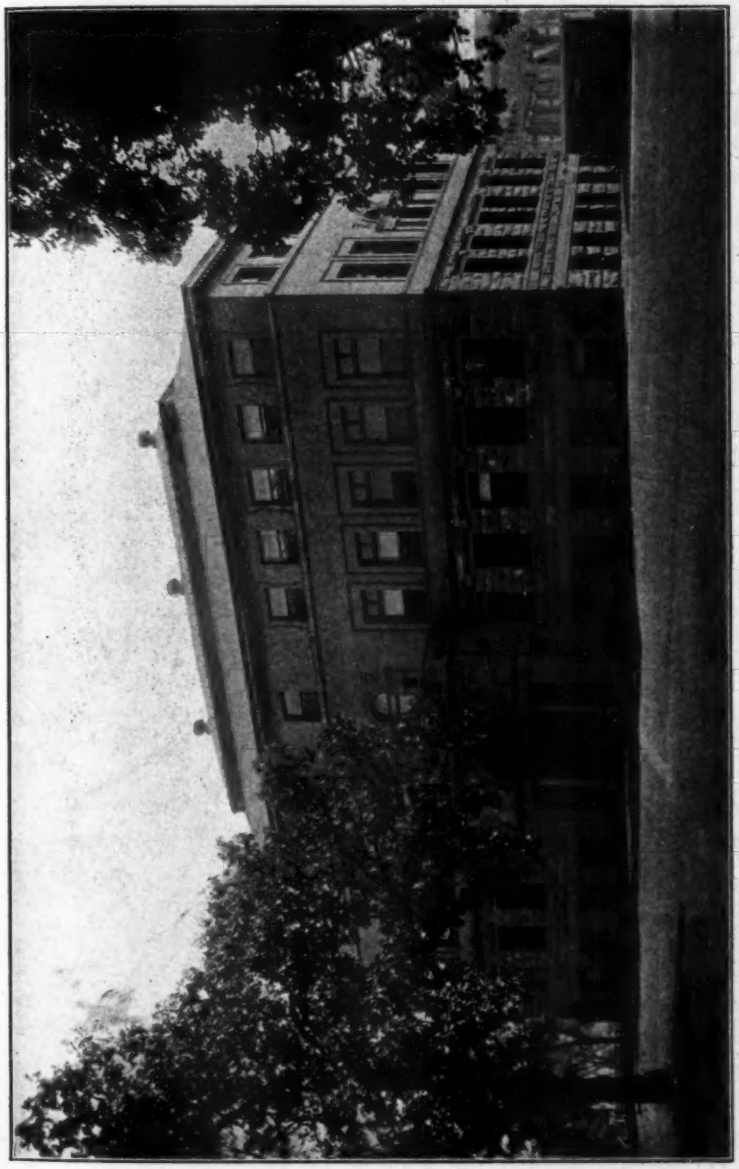

FIG. 1. The College of Pharmacy, University of Minnesota, Main Building, showing corner of Medicinal Plant Laboratory to the right.

the very life of the college was in the balance continually because of the hostile attitude of the medical college and the indifference of the regents, to a firm, substantial, recognized and unmenaced position now; from the position of an unrecognized, unwelcomed outsider in 1892 to a fully recognized, to be-reckoned-with and representative member of the university family in 1913, is a record with which any man can be well satisfied. Since the college emerged from the pioneer period, it has steadily gained in momentum, so that it sees itself now on the way to much more substantial and accelerating development and achievement within the next decade.

The new building with its equipment cost approximately $110,000. The building is 60 x 115 feet in dimensions and full four stories high, entirely fireproof and equipped with eight connections on each floor for hot and cold water, steam under pressure, gas, electricity for light and power; air pressure; vacuum cleaning system; elevator; steam heating with thermostatic control in every room; direct illumination in the laboratories and halls and indirect illumination in the lecture and recitation rooms, library and offices; sanitary drinking fountains; electric fan ventilation in every large room; intercommunicating telephone system; electric clocks in every room regulated from a central system; four toilet rooms and a women's retiring room; metal weather strips and metal screens on all windows; washable window shades with additional black opaque shades for the lecture room and recitation room for lantern work; eight sockets on each floor for electric motor attachments for motors varying in power from $\frac{1}{16}$ h. p. to 10 h. p.; attachment for projection apparatus in the lecture room and two laboratories; alberene stone sinks; fire protection on every floor, etc. The building was constructed by erecting within the old stone walls a strong steel skeleton for the walls, floors and roof. The floors are constructed of tile set in between steel crossbeams. A substantial grouting covers the tiles and something over one inch of solid finish cement over the grouting. The cement floor is covered with a special cement paint, giving a very smooth and sanitary floor. The thick paint consisting of several coats takes away much of the hardness of the cement floor.

A central hall divides the building on all floors into two equal halves. The west half of the full-height and fully lighted basement is connected with the adjoining medicinal plant laboratory by a tunnel. This half of the building is devoted to a commercial pharma-

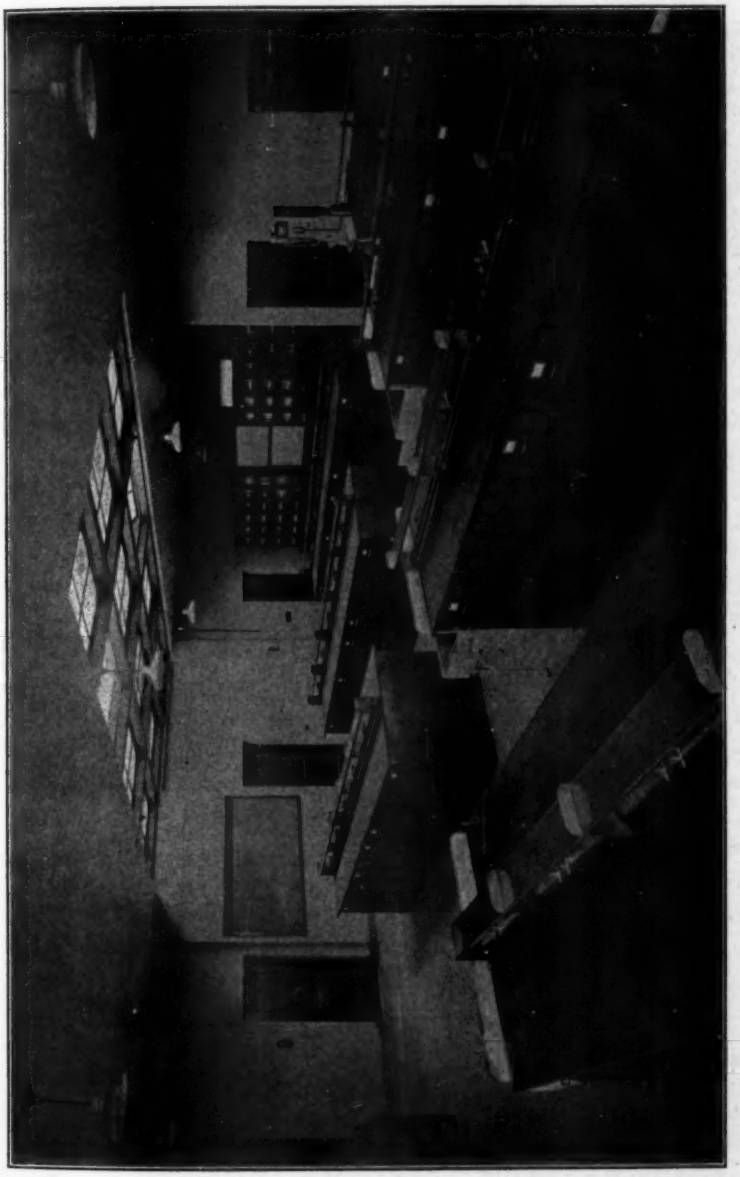

FIG. 2. One of the Pharmaceutical Laboratories, College of Pharmacy, University of Minnesota, showing the enamel steel furniture equipment and large skylight.

cognosy laboratory, a students' lunch and locker room, and a suite of three rooms for photographic purposes consisting of a dark room, a developing room and a camera room. The photographic department is furnished with an arc lamp, mercury lamps, and with other equipment required for general photographic and micro-photographic work. The east half of this floor contains a large pharmaceutical manufacturing laboratory for the rougher work, a locker room and a storage room. There are two front entrances and three rear entrances to this lower floor. The central rear entrance leads into the sub-basement unpacking room, from which room shipments and material are distributed to the respective parts of the building by the elevator, which has its lower terminus in this room. Nearby a room supplies space for acids and inflammable chemicals and in one of the angles of the room the motor for the vacuum cleaning system is placed.

The first floor contains the lobby, which is lighted from the ceiling by a cluster fixture. The main clock is located here. The floor of this hall as well as of the upper halls is of tile. The east half of this floor contains the library, the dean's offices and private laboratory. In the west half is located the pharmacognosy laboratory proper and a preparation room and an office. The west half of the second floor contains the lecture room, the east half a smaller lecture room and the dispensing laboratory and stock and preparation room. The third or top floor is devoted entirely to laboratory purposes, the west half containing the pharmaceutical chemistry laboratory with preparation and stock rooms and the State Board of Pharmacy stock room. The east half is taken up by the pharmaceutical laboratory with adjoining stock and preparation room and balance room. The upper floor is lighted not only by large windows, but by a ceiling skylight as well. The roof is entirely fireproof, of steel and concrete construction with slate shingles, the whole surmounted by a lantern skylight containing three large ventilators to ventilate especially the two upper laboratories. The spacious room in the attic is utilized for the drying or curing of drugs from the drug garden.

The furniture equipment is almost entirely of steel, consisting of steel work-tables, cupboards, lockers, cabinets, shelves, hoods, drug bins, animal cages, library stacks, etc. The steel furniture is made of a heavy gauge steel covered with an olive green baked-on enamel. All tops are of cypress stained black to withstand the action of acids, alkalies and chemicals generally.

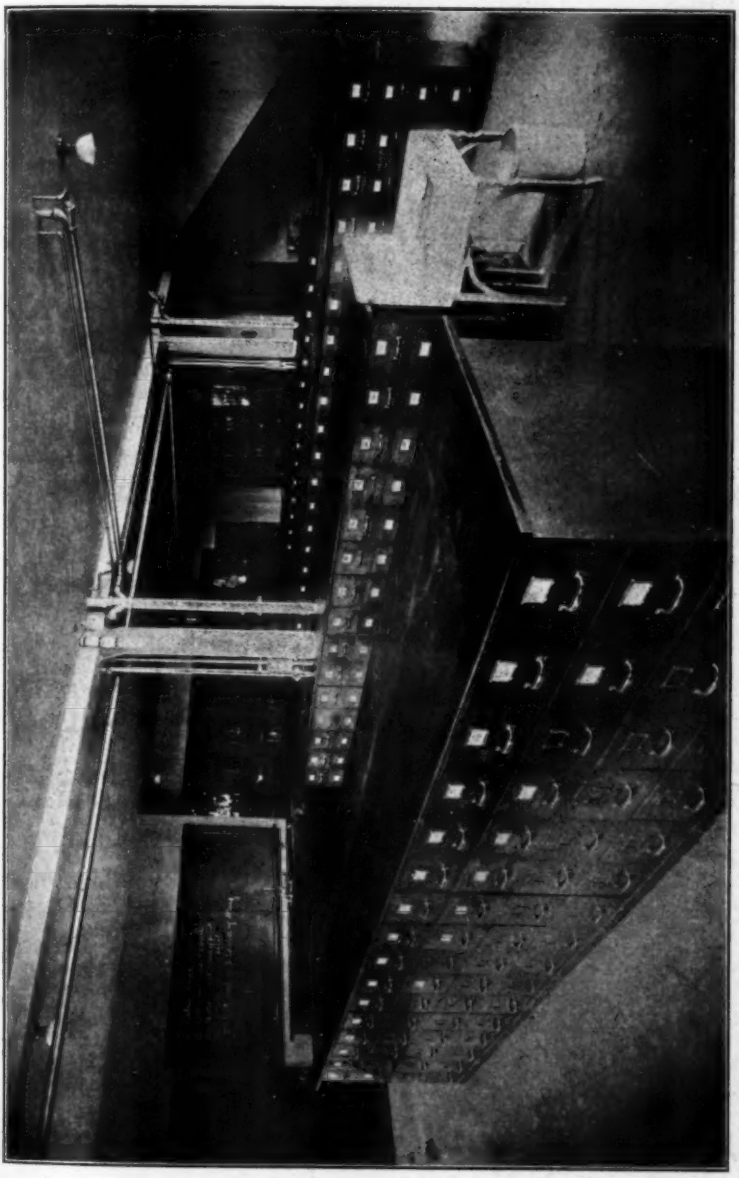

FIG. 3. Commercial Pharmacognosy Laboratory, College of Pharmacy, University of Minnesota, showing the steel cases with dust proof drawers for storing crude drug stock.

PHARMACEUTICAL DEPARTMENT.

As has already been stated the department of pharmacy with its lecture and recitation rooms and laboratories occupies the entire third floor and a part of two other floors. The laboratories cover a floor space of approximately 11,000 sq. ft. The laboratories on the third floor are fitted out exclusively with specially designed and most modern steel furniture, including students' work tables in the center of the laboratories, cupboards, drawers, enclosed shelving, hoods, wall cases, steam and sand baths, along the outer walls. This steel furniture is covered with olive green baked-on enamel, rubbed down to a smooth surface. The locker and drawer handles and label holders are of solid brass. The laboratory in the east half of the top floor has easy access to a balance or weighing room and a stock and preparation room. The latter is separated from the main laboratory by a unique steel case 25 feet in length, 3 feet wide and about 10 feet high, with a central opening of four feet above the top, which serves as a students' supply window. The side facing the main laboratory is provided with shelves enclosed with glass doors on which pharmaceuticals are placed for exhibition purposes. The lower part of the inner side of the case consists of cupboards for storage purposes. The upper part consists of shelves for tincture and other display bottles. The preparation room has direct access to the elevator and is supplied with an alberene stone sink and drainboard and on the south wall with a series of thirty drawers for laboratory supplies, utensils and storage. Over these drawers are a series of shelves for stock bottles, etc. The weighing room, about 16 x 12 feet in dimensions, is provided with suitable supports for balances so made and placed as to reduce vibration to the minimum. The construction of the building is so solid and substantial that very little vibration is felt anywhere, even while the trains, not 200 feet distant, pass by.

The main laboratory of the east half of the top floor provides steel working tables for eighty students working at one time. Each student has a locker 3 feet 4 inches high, 18 inches wide and 2 feet deep, containing an adjustable shelf, another locker 2 feet 8 inches high, 18 inches wide and 2 feet deep and over this an 8 inch deep drawer provided with side suspensions, insuring easy operation of the drawer and keeping it always level in any position. The table space assigned to each student is three feet wide by two feet deep. The table tops are of cypress covered with a special acid and stain

proof preparation. Running lengthwise over the tops of the tables in the center is a steel shelf eight inches high, affording room for reagent bottles. Under this shelf runs the 1½ inch gas main, supplying each student with gas for fuel purposes from the two lever gas cocks.

Each of the eight students' work tables provides room for ten students at one time. At the end of four of these long tables are located alberene stone sinks, 2 feet by 4 feet in dimensions, provided with hot and cold water, steam under pressure and water and hose connections. Each pipe has a shut-off below the sink. On the inner hall wall are located a six-foot alberene stone sink, the lecture or demonstration table on a platform, a spacious slate blackboard, cupboards surmounted by percolating racks, and a sand and steam bath.

The lecture table is provided with hot and cold water, gas, steam under pressure, electric current and air pressure. Over the lecture table and elsewhere in the laboratory are located pulleys for the exhibition of charts. The main hood, which is made of steel, is found in the northeast corner of the room. The central portion reaches a height of about nine feet and to each side a wing is attached, located under the high windows, but high enough to serve as fume chambers. These wings empty into the central portion of the hood, which is exhausted at the top through the window at the north side of the building where current is created by an exhaust fan operated by a motor. This hood, like all others in the building, has cupboards below, covered with soapstone. All portions exposed to fumes are asbestos lined and painted over with a special fume and acid proof preparation. This laboratory has no posts in view. All of the supply pipes, such as hot and cold water, steam, gas and the waste pipes, are brought up through the floor from the ceiling below, where attachment to the various supply pipes is made. The floor of this laboratory, like all other floors in the building, has a top coating of an inch and a half of cement and is provided with floor drains so that the entire floor can be flushed. It is not the purpose to flush the floor, except possibly in parts, but in case the water leaks anywhere it will drain off into the sewer. This is true of all the floors in the building, each floor having four large floor drains. All floors are covered with three coats of special cement paint.

This main pharmaceutical laboratory is lighted by twelve electric ceiling fixtures, the eighteen-inch shades of which are of white

enameled steel, fitted wtih clusters of four tungsten lamps of sixty watts each, affording a very brilliant illumination on dark days or late afternoons during the winter months. The day lighting of this laboratory is excellent. The wall windows are numerous and large and in addition there is a very large ceiling skylight admitting a flood of light. The frosted glass in the ceiling skylight prevents the glare of direct sunshine, which however rarely strikes this ceil-

FIG. 4. Medicinal Plant Laboratory, College of Pharmacy, University of Minnesota, interior view, showing arrangement of plant benches and aquatic pool.

ing skylight directly since the light must first pass through the roof skylight. On this account there is for the most part a soft diffused light in the room. This and all other laboratories are connected by an intercommunicating telephone system with the Dean's office. One of the nine electric clocks provided for the building is located in this laboratory. The laboratory is entered from the central hall by three doors affording ample ingress and egress. It is ventilated through the skylight, two special devices affording easy means for the opening of the three large copper ventilators in the

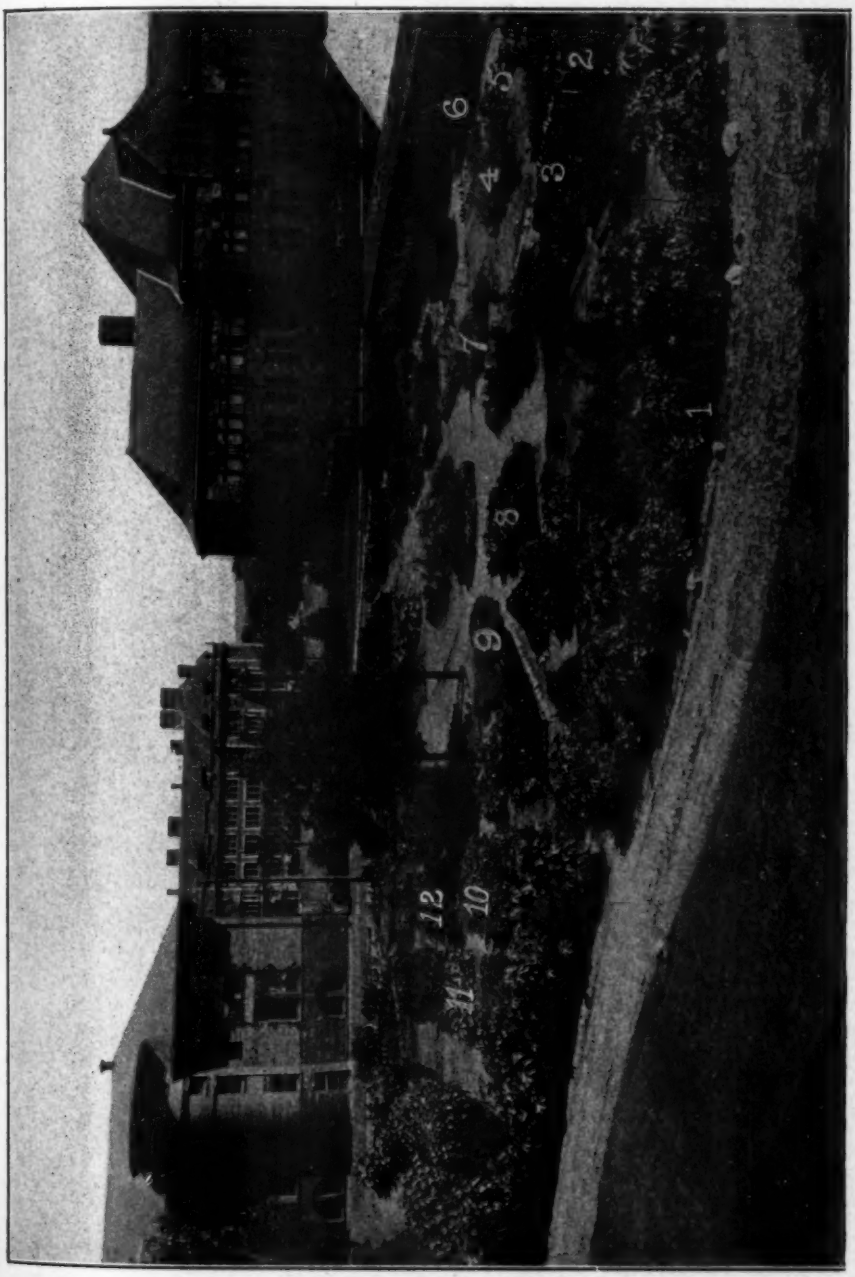

FIG. 5. Medicinal Plant Garden, College of Pharmacy, University of Minnesota.

lantern of the roof. Electric current attachment for motors up to 5 h. p. is provided in four convenient places in this laboratory.

The laboratory occupying the west half of the third floor is planned and furnished identically as the laboratory just described, with the exception that it contains an additional small room on the south side to be used for weighing purposes, the space for which has been taken from the preparation and supply room. In this laboratory a room is provided for the Board of Pharmacy in which to store its supplies.

FIG. 6. Slat House for Shade Loving Plants, Medicinal Plant Garden, College of Pharmacy, University of Minnesota, showing hydrastis, podophyllum and cimicifuga in the foreground.

The subjects in which pharmaceutical work is carried on include the physics of pharmacy, pharmaceutical processes, operative pharmaceutical chemistry, junior and senior operative pharmacy (both organic and inorganic), U. S. P. testing, quantitative analysis of U. S. P. salts in preparations, National Formulary work, Pharmacopœial assay, dispensing and study of incompatibles and

the identification of pharmaceuticals There is a thorough coördination of the work in the several departments, so that the preliminary work in connection with the making of galenicals is carried on in the department of pharmacognosy.

Department of Pharmacognosy.

Under the title of Materia Medica, the department devoted to the study of crude drugs was limited in its scope and was not expensive to maintain. This department, which formerly dealt in generalities, is now happily replaced by a department of fact and practice, viz., pharmacognosy. This latter department requires many facilities and an outlay of money to maintain it properly. The first prerequisite in such a department is a medicinal plant garden. In this the student should become acquainted with growing plants, and if he is required to collect the drugs, making assays upon them and preparations from them, he will understand why preparations vary in strength and are frequently inert. The medicinal plant garden of the University of Minnesota covers 50,000 sq. ft. and is under active cultivation, containing most of the official drug plants and several hundred unofficial drug plants. The students are required to examine the growing plants, later collecting the drug portions, drying them, powdering them and making preparations from them. In addition to the medicinal plant garden, the school has a large greenhouse adjoining the pharmacognostical laboratory. In structure it is like a palm house, allowing ample room for growing tropical medicinal trees.

The department is well equipped with facilities for drying drugs and has a large milling laboratory. The equipment includes large drying ovens, 10 h. p. motor, shaftings and pulleys, drug thresher, fanning mill, disintegrator mill, limited mill, gyrator sifter, small motors and small drug mills, steel carriage drug bins and work tables. A part of this floor is devoted to inclosures, especially designed and constructed of steel for guinea pigs, rabbits, roosters and other animals for physiological drug testing. Storage bins of steel are provided for pots and soil. The wash room and mechanical room, containing the switch boards, steam trap, tool bench, etc., occupy the north end of the floor.

The plant laboratory building is provided with hot and cold water, high and low pressure steam and a conduit laid in concrete

for electric light, power, exhaust fans, class bells and telephones. The construction throughout is of concrete, brick, steel and glass and its architectural simplicity presents an exceedingly pleasing aspect.

A passageway leads directly from the milling laboratory to the commercial pharmacognosy laboratory on the ground floor of the main building. In this latter laboratory are steel cases with tightly fitting covered drawers. These cases, with about 500 drawers, hold the main vegetable drug stock. The tops of the cases are used by the students for work in drug garbling and identification. A vacuum drier, steam distillation outfit and other extraction apparatus are located along the west side of the laboratory. Space for sterilizers and special apparatus and desk room for special students is provided along the south side.

A suite of rooms for photographic work adjoins the commercial laboratory, including dark room, camera room and printing room. Facilities are also provided for the making of reproductions by means of the Edinger drawing apparatus. Other apparatus already in use includes a large plate camera and a micro-photographic camera. The dark room is provided with all the facilities necessary for the preparation of autochrome negatives showing the true color of medicinal plants or other objects.

The main pharmacognosy laboratory is situated on the first floor, directly over the commercial pharmacognosy laboratory, with which it is connected by a broad stairway. The laboratory is furnished with specially designed students' desks for microscopical work and each desk is provided with closets for simple and compound microscopes, drawers, micro-chemical reagents, permanent slide collection, and collection of authentic powders in sprinkle-top bottles. Both natural and artificial light are available for use. A long blackboard and demonstration desk occupy one side of the room and cases are provided for charts, maps, pharmocognosy models, drug specimens, etc. A part of the room is reserved for herbarium work and cases for other botanical specimens. Splash sinks are located at convenient places. A stock and preparation room is located on the south side of the laboratory for the preparation of special microscopic mounts and for storing microscopical accessories, reagents, etc. A projection lantern for microscopic, opaque and lantern slide work has been installed in the main laboratory so that any difficult part of the work may be clearly elucidated during laboratory in-

struction. The special equipment includes: polariscopes, microspectroscopes, a large sliding microtome, centrifuges, extraction apparatus, apparatus for physiological work, balopticon, etc.

Library.

Reference books and journals are absolutely indispensable in a teaching institution. Fortunately the conditions at the University of Minnesota are such that each department has its own library. In the College of Pharmacy it occupies the greater part of the east half of the first floor of the building and includes a floor space approximating 1,600 square feet. The library is admirably situated, so far as lighting is concerned, since it has a southern exposure of 44 feet with four very large windows and an eastern exposure of 37 feet also well lighted by four large windows, each measuring 5 x 7 feet. The windows are supplied with shades almost exactly matching the very light brownish yellow painted walls, giving a very pleasing lighting effect, which is calculated to relieve the eyes as much as possible from strain from library work. The shades are of an imported material made at Lancaster, England, and are washable on both sides.

The steel library stacks which are so placed that the light from the spacious windows can be most fully utilized, are of the very latest construction, thoroughly braced in the center and on the top, thus affording a very rigid and substantial fixture. The shelves are adjustable. The width of the double stacks is 16 inches and of the two large double stacks for journals and large volumes is 21 inches, all of a height of 7 feet, 6 inches. The stacks afford 1,680 running feet of shelving, 11½ inches in height. Since most books are less than nine inches in height and as the shelves are adjustable, the total number of running feet for all sizes of books approximates 2,000. The stacks are of a heavy gauge steel with curved corners, a substantial base and an ornamental cornice of olive green, baked-on, rubbed-down, enamel finish. The passageway between the stacks approximates 3 feet, with two substantial equidistant electric lights in the center to facilitate book work at night. In addition to this direct lighting between the stacks, there is abundant provision for the indirect illumination of the entire room from the ceiling. The floor of this room is of cement, covered with a special cement paint.

QUARTERLY REVIEW ON THE ADVANCES IN PHARMACY.

By John K. Thum, Ph.M., Lankenau Hospital, Philadelphia, Pa.

America's entrance into the Great War continues to be the great topic, and the cause of unprecedented activity and preparations for preparedness, in all walks of our daily life.

Top-notch efficiency for the conduct of the war will only be obtained by selecting and utilizing those of our citizens who are especially fitted and trained to look after the welfare of our youth who must make this fight for us. Not only must the best brains of the country be brought forward to train them in all the newest methods that have been developed in modern warfare, but the best that we have in medicine and surgery—and particularly preventive medicine, hygiene and the latest and most improved methods of sanitation—must be utilized and placed at the disposal of the young men of our country who will be called upon to make the great sacrifice. Men who are willing and prepared to give their life for their country—and no sacrifice can be greater—should at least be made to feel that everything that is humanly possible is and will be done to prevent disease and give that medical and surgical attention to the wounded that is so vital and necessary.

And this brings to the rôle that the pharmacist must play in this great drama and tragedy, for it is all of that!

There has never been any great number of pharmacists in our army because of the fact that they can only enter as a private or enlisted man and never rise to any greater rank than to that of a non-commissioned officer. It is needless to say that this is a strong deterrent against enlistment of young men who have had the advantages of a good preliminary as well as a good scientific education. And for this reason, and no other, the fighting men of our army have had to submit to the dispensing of medicines by men who are not qualified to perform this important function.

We believe we are right in making the statement that the bulk of the dispensing and pharmaceutical work is done by ordinary enlisted men who have about the same qualifications as an ordinary hospital orderly or male nurse. Surely the men in the field are entitled to better than this! In civil life the pharmacist stands between the

patient and the physician. If the physician should by chance write for an over-dose of a potent medicine—and there are cases in which he has been known to do that very thing—the law holds the pharmacist responsible. Has the soldier of the regular army the same protection? Will our sons and brothers who have volunteered and been selected for the new National Army have every safeguard in this respect? We are constrained to utter an emphatic no! Not if the present method of medicinal administration is continued.

As for pharmaceutical work, there certainly can be none, or at best, very little done. The army physician must rely very largely on manufacturing pharmacists for practically all of the pharmaceutical preparations prescribed by him. Is he capable of assaying these? And would it be possible for him to find time for such work even if he were capable of such work? Will he find time to make any of the simplest tests for chemicals, etc.? Even now we hear it rumored that the government is experiencing much difficulty in getting the adequate quota of doctors for the first army.

Granting that the army will be able to mobilize the necessary number of physicians, experiences related by keen observers from the theatre of war teem with information as to the busy times the medical men are having and the tremendous strain that the whole field of medical and surgical organization is subjected to. Under such conditions it will be absolutely impossible for the medical men to interest themselves in the drug supply of the army and neither should the government expect it of them. It is not right that they should have this burden put on them and the sooner it is removed and placed where it rightly belongs the better for the fighting men of the army and the medical men themselves. To right thinking men and women the logical solution of such an anomalous condition is proper organization of the pharmaceutical ability of the country for service in the army. If physicians, dentists and veterinarians are given recognition for their special ability and training, by the government, why may not the same official recognition be given to the men of the pharmaceutical profession? In no period in the whole history of the world was it ever more necessary for the intelligent coöperation of service and special ability than it is in this epoch-making time. It is the solemn duty of a nation to take special care of the health of its fighting men, and the people of this country should demand that Congress enact the necessary legislation for the creation of a pharmaceutical corps of the army. Such an act, pro-

viding for commissions as officers, would attract to the service men, whose scientific ability and technical training as pharmacists could be utilized in many ways.

It is gratifying to note that following their accustomed initiative, the allied pharmaceutical organizations of Philadelphia have combined to form an organization to bring about this very thing. This organized body has been named the Pharmaceutical Military Association.

There is also cause for gratification in the fact that the Journal of the American Medical Association favors the organization of such a pharmaceutical corps and in a recent editorial points out the advantages its creation would bring to the medical men of the army. In a recent communication to the New York Medical Journal, Dr. J. Madison Taylor puts the case so well for the pharmacist that we quote him as follows:

"We have no desire to be hypercritical of the Medical Department of the army and navy—we realize fully the serious burdens they are carrying—but in my judgment there is grave peril that in the near future the demands upon the military medical service will be so many and serious that it might break down from overwork. It is to prevent this, to anticipate, that we make the constructive suggestion that steps be taken immediately to provide a sufficient number of assistants skilled in all branches of service required for the Medical Corps.

"There are several ways through which this assistance can be given—by utilizing medical students by utilizing nurses, and by utilizing pharmacists. The first is economically, unwise, because medical students are potential physicians and surgeons, and will be needed later on to take the places of the medical men now in the service. The second is objectionable by reason of the limitation of a nurse's training along medical lines and also her sex. The third is the most promising, because it furnishes material that, with but little intensive training, could be made most helpful to the physician and the surgeon. He could cover more ground more throughly, more deliberately, and more creditably to himself, to the service, to his country and to all of humanity.

"The skilled pharmacist of today has had collegiate training and years of practical experience, with a manipulative skill in the handling of materials that eminently fits him for minor medical and surgical work. At the present time the pharmacist is taught a series of

subjects which qualifies him to supplement the work of the surgeon on closely co-related lines, especially in chemistry, bacteriology, clinical laboratory investigation, roentgenography, in assaying drugs, foods and other supplies, in analyzing human excretions, blood, sputum, etc., in testing drinking water, food products, soils, as well as in toxicology and drug compounding and dispensing.

"In any event, the services he could render are numerous, among them note taking, examinations, diagnoses of minor ailments, prompt clinical laboratory findings, and opinions would be invaluable. He could act as expert anæsthetist, as assistant in many operative directions, and could apply the less complicated dressings and plaster casts, and variously hold up the hands of the surgeon. He could apply much of the detail of medical advice in hygiene and dietetics. The whole subject of sanitation falls naturally within his purview, the precautions of hygiene, of preventive medicine generally, also applied bacteriology, disinfection and other prophylactic necessities of modern warfare.

"Justice to the medical men of the army and navy demands that they be given adequate assistance in the prosecution of their work, and the suggestion that skilled pharmacists be given a commissioned rank in the army and navy, and that they be made, also, medical and surgical assistants, will meet, we believe, not only with the unqualified approval of the medical profession generally, but with that of the public whose interests are still further protected."

PREPARATION OF DICHLORAMIN T.—Chlorinated lime of pharmacopœial strength—from 350 to 400 grams—is well agitated with two liters of water for half an hour. When sedimentation has taken place the supernatant fluid is siphoned off and the remainder filtered. Powdered toluene-parasulphonamid, 75 grams—the crude product may be used—is dissolved in the chlorine solution. If necessary the resulting solution is then filtered, placed in a separating funnel, and made acid by gradually adding 100 mils of acetic acid. 100 mils of chloroform is then added to extract the dichloramin. After frequent vigorous agitation the chloroform layer is drawn off, dried over calcium chloride, filtered, and allowed to evaporate in the air. The residue then obtained is powdered and dried in vacuo. If necessary it may be purified by recrystallization. Generally it is not necessary.

This chemical is stated to be powerfully germicidal and is generally used dissolved in a mixture of Eucalyptol U. S. P., which

has been chlorinated, and Liquid Petrolatum also chlorinated, equal parts of each. The amount of Dichloramin T dissolved in this mixture varies from 5 to 10 per cent., which is from twenty to forty times the strength of the Carrel-Dakin Solution, for which the Dichloramin T mixture is claimed to be a far superior substitute (*Jour. A. M. A.*, July 7, 1917, p. 27).

THE PROTEINS OF THE PEANUT (*Arachis hypogaea*).—The increasing popularity and consequent increased production of the peanut makes a study of its proteins especially appropriate at this time, a time of ever increasing demand for food-stuffs. Heretofore the proteins of the peanut have received scant attention. This investigation, undertaken in the Protein Investigation Laboratory, Bureau of Chemistry, Washington, D. C., discloses that this popular nut contains two globulins, *arachin* and conarachin, as well as small amount of albumin. Oil-free peanut meal was used in the investigation, obtained by expresion of raw Virginia peanuts with the aid of an Anderson expeller. The pressed cake was finely powdered and remaining oil removed by percolation with petroleum ether. Nitrogen estimation showed 18 per cent. equivatent to 45 per cent. protein. Extraction of the meal with 10 per cent. solution sodium chloride, 32 per cent. protein, is dissolved at room temperature, 78 per cent. of which was obtained in pure form by dilution of salt extract with 5 or 6 volumes of distilled water, or by saturation with CO_2. It was also possible to obtain these globulins by dialysis of the salt solution. The two globulins were isolated by means of fractional precipitation of the protein extracted by salt solution. Arachin, which predominates among the globulins in the peanut, is the least soluble, and is precipitated when in a 10 per cent. solution of sodium chloride by the addition of ammonium sulphate to 0.2 of saturation. After separation of the arachin by filtration, conarachin is obtained by dialysis, or by saturation of the filtrate with ammonium sulphate. These two globulins show quite a difference in the sulphur content; it being 0.40 and 1.09 per cent. respectively. The distribution of nitrogen, particularly in the precentage of basic nitrogen, presents likewise a large difference, the figures being respectively 4.96 and 6.55 per cent. The basic nitrogen in a mixture of these globulins is likewise very high, namely, 5.23 per cent. It is just possible that conarachin contains more basic nitrogen than any other seed globulin so far investigated. Judging from the results so far obtained it seems safe to predict that peanut press cake will be found very useful

in supplementing food products made from cereals and other seeds whose proteins are deficient in the basic amino-acids (*Jour. Bio. Chem.*, vol 28, 77, through *Jour. Franklin Institute*. July, 1917, p. 120).

FORMALDEHYDE FOR SEED GRAIN.—Dilute solutions of formaldehyde gas are said to be very effective in preventing parasitic diseases of seed grain and therefore increasing the crop. 250 mils of the 40 per cent. solution, known as formalin, diluted to make 160 liters, is used to moisten 50 bushels of oats or other grain. It is left in a heap for 3 hours and then spread out to dry. Pharmacists in rural districts would do well to call this matter to the attention of their farmer customers (*Bull. Pharmacy*, 31, 1917, J. E. Taylor).

DULCIN AS A FOOD SWEETENER IN GERMANY.—Because of the scarcity of sugar in Germany the laws forbidding the employment of artificial sweetening substances have been repealed. And in lieu of our old friend "saccharin" they are using a new synthetic to which has been given the names "dulcin" and "sucrol." Chemically it is known as paraphenetolcarbamide. Statements are made that this substance is absolutely harmless to man and animals; it is also claimed that it has the advantage over saccharin in that it has no bitter after taste, and that it does not mask natural flavors. It has been found that its sweetening strength is two hundred times that of sugar (*Chem. Zeitung: Chem. Abstr.*, 1917, 11, 999).

MERCUROPHEN.—This chemical is stated to be powerfully germicidal and of great use as a local antiseptic. Chemically, it is said to be sodium oxymercuryorthonitrophenolate. The mercurial content is said to be 53 per cent. This compound occurs in the form of a brick-red powder, free from odor and very soluble in water; very dilute solutions show amber-yellow. The powder is easily made into compressed tablets which dissolve very readily. Against *Staphylococcus aureus* it has shown itself to be fifty times more active than mercuric chloride, killing the bacteria on prolonged exposure in bouillon in a dilution of 1–10,000,000. It claimed to have a lower toxicity than mercuric chloride (*Jour. Amer, Med. Assoc.*, May 19, 1917).

DIGITALIS AMBIGUA.—Investigation of the leaves of this plant, which grows in abundance in Austria, seems to show that the activity from a therapeutic standpoint is on a par with that of the normal leaves of *Digitalis purpurea*. If this is so, there is no reason why they should not take the place of the latter (*Chem. Zeitung*, vol. 41, p. 99).

RHUBARB LEAVES POISONOUS.—The sudden death of a person alleged to have eaten rhubarb leaves has been reported from Enfield, England. The symptoms were those usual in cases of oxalic acid poisoning. Because of the scarcity of vegetables abroad the newspapers have been advising their readers to eat stewed rhubarb leaves as a substitute for cabbage. It is reported that a similar instance of death from the same cause occurred in 1901. The leaves are not usually used as food but nearly everywhere the stalks are consumed in the form of sauce and in pies. The leaves and stalks contain citric, malic, and oxalic acids, mainly as the calcium, magnesium and potassium salts. As is well known, the oxalic acid is decidedly toxic. Poisoning from eating the stalks is very rare; in fact literature contains no such record. The stalks seemingly contain less of this toxic acid. And then the amount eaten at a single meal is very small. It would be well not to encourage leaf consumption (*Jour. A. M. A.*, June 30, 1917, p. 1954).

D-MANNOKETOHEPTOSE: A NEW SUGAR FROM THE AVOCADO.—The ripe fruit of *Persea gratissima* contains a ketose of seven carbon atoms which was isolated in the crystalline condition and found to be d-mannoketoheptose. Its formula was established by analysis of its bromphenyl hydrazon and phenyl osazon and by a comparison of the latter derivative with the osazon of mannoaldoheptose; also by the fact that it yielded the two epimeric mannoheptits on reduction with sodium amalgam. The melting-point of the new sugar registered 152° and its specific rotation + 29.° Treated with yeast no fermentation was manifested; it was not changed by bromine in aqueous solution. It is said that this is the first heptose to be found in nature (*Jour. Biological Chem.*, vol. 28, 2, 1917, through *Jour. Franklin Institute*, July, 1917, p. 120).

IMPURE PICRIC ACID AS A SOURCE OF ERROR IN CREATINE AND CREATININE ESTIMATIONS.—It is stated that some specimens of this acid, especially those bought in a wet condition, contain some impurity, and, owing to the more or less intense coloration they give when neutralized with NaOH, are quite unsuitable for use in the colorimetric estimation of creatinine. When 20 mils of saturated picric acid solution are treated with 1 mil of 19 per cent. NaOH, the color, after fifteen minutes, should be not more than about twice as deep as the color of the saturated picric acid solution (O. Folin and E. A. Doisy, *Jour. Bio. Chem.*, 1917, 28, 349, through *The Analyst*, April, 1917, p. 149).

KAFARIN, AN ALCHOHOL-SOLUBLE PROTEIN FROM KAFIR (*Andropogen sorghum*).—Until the present time no work has been done and reported concerning the proteins of kafir. Seeds grown in Kansas were used in this experimental work, of the kind known as dwarf kafir. The ground seeds showed 11.7 per cent. of protein, 7.9 of this was obtained by extraction of the meal with boiling alcohol. By the use of alcohol ranging from 60 to 70 per cent. strength, there was separated 5.2 per cent. of pure protein, *kafirin*. Kafirin in many respects resembles zein from maize, with this difference, that zein is very soluble in 70 per cent. alcohol at all temperatures, kafirin requires a large amount of the same strength of alcohol to effect solution. Kafirin is more readily soluble in hot than in cold alcohol; very dilute solutions will jelly on cooling. To avoid this it was necessary to use large volumes of alcohol and to filter the extractions while hot. Kafirin is easily coagulated while an alcoholic solution of zein does not when heated. It also differs from zein in the percentage of amide and basic nitrogen being 3.46, 2.97 and 1.04 and 0.49 per cent. respectively. There is also a difference in the amounts of diamino acids yielded. Kafirin contains lysine and tryptophane, which are absent in zein, and very necessary for animal nutrition (*Jour. Bio. Chem.*, vol. 28, 59, through *Jour. Franklin Institute*, July, 1917, p. 122).

SOME PROTEINS FROM THE JACK BEAN (*Canavalia ensiformis*).—*Canavalin* and *concanavalin*, two globulins, and an albumin, have been obtained from this bean. The air-dried jack bean meal showed the amount of protein to be 23 per cent., and 15 per cent. of this is extracted from the meal by plain distilled water. Two per cent. solution of solution of sodium chloride increases the amount of extraction to 18.5 per cent. 0.2 per cent. solution of KOH extracted almost all of the protein, or 22.3 per cent. A mixture of meal and three times its weight of 10 per cent. solution of sodium chloride, and then ground in mill to break up cells gave an extraction of 20.5 per cent. protein. Dialysis of salt extracts of the bean against distilled water gave 10 per cent. of pure dried globulin, based on weight of the meal used. This globulin is so very soluble in salt solutions that it cannot be precipitated by diluting these solutions with water. The globulin of the jack bean is not identical with phaseolin, which substance was isolated by Osborne from the kidney bean (*Phaseolus vulgaris*). Concanavalin, the globulin present in the jack bean in the smaller amount, and which is less soluble, was

precipitated from a one per cent. salt extract of the meal by adding ammonium sulphate to 0.6 of saturation. The precipitate was filtered off, redissolved in water, and dialyzed until free from sulphates. Canavalin was obtained by making the filtrate from the concanavalin completely saturated with ammonium sulphate. The principal difference between the two globulins is in their sulphur content; the one is 0.48 and the other 1.10 per cent. From the analyses of these two globulins it is evident that only a small amount of concanavalin can be present in the mixture of globulins obtained by dialysis, since the sulphur content of canavalin and the mixture of globulins are practically the same. Canavalin estimates 3.17 per cent. of basic nitrogen. The albumin, which contains 3.73 per cent. of basic nitrogen, resembles the legumelins which have been described by Osborne and his co-workers (Abstracted from the *Jour. Franklin Institute,* July, 1917, p. 119).

Chemical and Physiological Detection of Several Alkaloids in the Same Solution.—The well-known play of colors which occurs when strychnine is brought in contact with sulphric acid and potassium dichromate is not realized when 1 milligram of strychnine nitrate and 0.04 gram or more of quinine bisulphate in the same solution are treated thus, a passing garnet-red color appearing, which changes to green or greenish-gray; with smaller quantities of quinine this reaction is distinct, but transient. The same result is noticeable when salts of the alkaloids with the same acid or just plain alkaloids are used. Crystals of strychnine picrate may be formed in the presence of a large excess of quinine, but they are not then characteristic. The alkaloids are easily and certainly separated by treatment with sodium potassium tartrate; quinine tartrate being insoluble in solutions of alkali sulphates and tartrates, whereas the strychnine salt is soluble. It is observed that mixtures which do not give the characteristic reaction with potassium dichromate do not produce the characteristic symptoms in the frog (*The Analyst,* May, 1917, p. 177).

Another New Source of Potash.—The U. S. Geological Survey reports the separation of potash from wyomingite, a lava found extensively in the Leucite Hills of Wyoming. This mineral is a silicate of alumina and potash, containing much more potash than feldspar. By heating to a dull-red heat with calcium chloride 73 per cent. of potash is readily obtainable.

The Volatile Reducing Substance in Cider Vinegar.—Ex-

perimental work in the preparation and purification of the phenylosazone obtained from the distillate from cider vinegar shows that such distillates contain a reducing substance that reduces Fehling's solution at room temperature. Judging from the melting-point of the phenylosazone obtained in these experiments and the amount of nitrogen it contained the indications point to its being diacetyl phenylosazone. Diacetyl and acetylmethylcarbinol, two substances from which this osazone could be formed, were made, and the actions of dilute solutions of these two substances were compared with those of the cider vinegar distillate. It was deduced that the reducing substance in the cider vinegar distillate is largely, if not altogether, acetylmethylcarbinol. It is stated that this substance is not formed during the distillation of vinegar but is present as such in the vinegar and certainly appears to be a normal constituent of cider vinegar (abstracted from *Jour. Franklin Institute,* July, 1917, p. 119).

CHRYSAROBIN.—Purified chrysarobin, or Goa powder, consists of the anthranols chrysophanol, $C_{15}H_{12}O_3$, and emodinol, $C_{15}H_2O_4$, and their methyl ethers. Emodinol methyl ether forms yellow needles melting at 180°; chrysophanol methyl ether is not present in the chrysarobin now in commerce, which is said to contain about 33 per cent. of chrysophanol. The therapeutic action of the drug is due to the anthranols only; it is claimed that the substances insoluble in benzene take no part in it (*O. Hesse, Liebig's Ann. d. Chem.*, throuhg *The Pharm. Jour.*, Apr. 28, 1917, p. 353).

TEST FOR CHLOROFORM.—To 10 mils of chloroform add as much benzidine as will lie on the point of a knife and shake gently, when a clear solution will form. If the specimen is pure, the solution will remain unchanged 24 hours if kept in the dark. If 0.01 per cent. of phosgene is present, it becomes cloudy at once; if 0.1 per cent. is present a yellowish-white precipitate is formed. When chlorine is present, the solution becomes pale rose in color, changing afterwards to a blue; if HCl is present, the solution becomes cloudy immediately (Utz, *Pharm. Zentralb., Apotheker Zeitung,* 32-60, through *The Pharm, Jour.*, Apr. 28, 1917, p. 353).

CULTIVATION OF MEDICINAL PLANTS IN GERMANY.—According to an article in the *Pharm. Zeitung,* volume 32, page 166, the governments of Prussia and Saxony are urging and encouraging the cultivation of plants for medical use. A commission has been appointed to give the matter careful study and to report on the

possibilities in this direction. Attention is called to the fact that improvements in agriculture are leading to the cultivation of land upon which wild drug plants were growing and to keep up this supply it is absolutely necessary to cultivate them. The medical profession for a long time was prejudiced against the use of cultivated medicinal plants as it was felt that the activity and potency of cultivated drug plants was very inferior to that of the wild plants. But chemical and biological assay have shown that such prejudice has no basis in fact and is rapidly becoming a thing of the past. Where such inferiority may exist or appear it is undoubtedly due to improper and unsuitable methods of cultivation. Careful observation and experimentation will bring about the best conditions for cultivation, when without doubt the active constituents will show an increase. It is also worth while that in the cultivation of these plants they can be collected at any given period of their development and also that they can be gathered free from admixture (*The Pharm. Jour.*, May 5, 1917, p. 375).

BOOK REVIEWS.

YEAR BOOK OF THE AMERICAN PHARMACEUTICAL ASSOCIATION 1915. Chicago, Ills: Published by the American Pharmaceutical Association 1917.

With the exception of the inclusion of the Constitution, By-laws, roll of Members, this volume is devoted to the report on the Progress in Pharmacy. The latter is the work of Professor Arny, Dr. Koch and a corps of collaborators. The work has been very well done, the abstracts being very succinct and yet containing the essentials of the articles relating to pharmacy and pharmaceutical products and preparations. It is difficult to conceive how any of the members of the Association could consider for an instant the possibility of doing away with this valuable publication. If it is true that is chiefly used by teachers and those engaged in research work this only proves the value of the Progress of Pharmacy that every one engaged in the practice of pharmacy should utilize it. It contains everything pertaining to the improvements in the preparation of medicaments and a great deal more. If the American Pharmaceutical Association stands for anything, its members should will-

ingly support this publication as it represents an ideal and shows that the Association means to develop the progress in pharmacy, and that its members have lofty sentiments and high ideals.

HENRY KRAEMER.

PHILADELPHIA COLLEGE OF PHARMACY.

ABSTRACTS FROM THE MINUTES OF THE MEETING OF THE BOARD OF TRUSTEES.

March 6th, 1917. Twelve members were present. The Committee on Instruction reported that Mr. C. J. Zufall had tendered his resignation as Instructor in the Department of Botany and Pharmacognosy, which was accepted. Committee on Examinations presented a communication from Prof. Roddy giving the names of the following students who had completed a Special Course in Bacteriology, and were, therefore, entitled to the Certificate: C. L. Coble, Wallace Dickhart, John F. Day, David Flores, George R. Gross, Edward F. Henning, Antonio Mena Hernandez, William Menkemeller, Jr., H. K. Mulford, Jr., Charles Norton, G. W. Neiffer, L. D. Rutter, Benjamin A. Sorber, Russell C. Smith, Albert Stoppel. The Board authorized certificates issued to the above. *The Special Committee on Diplomas* submitted a report proposing some changes in the form and wording of the diplomas. These changes were made necessary by the existing conditions. After the adoption of some of the proposed changes, it was ordered that a sketch be prepared and submitted at the next meeting of the Board. Karl F. Ehman, Class of 1916, was elected an Associate Member.

April 3d, 1917. Fifteen members were present. A communication from the Secretary of the College was read, announcing the election of officers for the ensuing year and three members of the Board of Trustees for three years. This being the first meeting of the new Board, George M. Beringer was elected Chairman; Walter A. Rumsey, Vice-Chairman and Jacob S. Beetem, Registrar. The Committee on Finance recommended that owing to the increased duties of Professor Stroup, the Editorship of the Bulletin be placed in the hands of Professor Sturmer.

Committee on Announcement read a report giving the approximate cost of publishing the six issues of the Bulletin, and recommending that hereafter the Bulletin be issued quarterly, namely, in

April, July, October and January. This would reduce the cost about 33 per cent. The Committee advocated an early issuance of the Catalogue Number and recommended that a definite and clear-cut policy regarding post-graduate instruction be outlined in same. The Committee referred to our Alumni and stated that the members of same should be kept well informed as to the post-graduate courses and other matters pertaining to the College, in order that they use their influence in assisting young men to matriculate in the College.

The recently established Advisory Council of the Alumni Association, embracing about one hundred of the more active members residing in every State of the Union and in twenty foreign countries, are earnestly working to further the interest of the College.

The Committee on Instruction also recommended that authority be given members of the Faculty to give a few lectures in the high schools of Pennsylvania in accordance with the suggestion of Prof. Sturmer. On motion, the recommendations were adopted.

The Special Committee on Diplomas, through Mr. Cliffe, presented the sketch for the new Ph.G. diploma and after some discussion the form submitted was adopted.

Mr. French read a communication from Colonel Allen, First Regiment, N. G., U. S. A., relative to four of our graduates students, who are now absent from the college, serving in the Medical Corps. Mr. Osterlund said he was particularly interested and hoped something could be done towards graduating the young men who were called to serve their country. The matter was referred to the Committee on Examinations.

The communication from the Secretary of the College was read, conveying the resolution adopted by the College at the annual meeting, recommending to the Board of Trustees that they extend the services of the College to the Government. Mr. Cliffe moved that the matter be referred to a Special Committee consisting of the President, Chairman of the Board and the Dean. It was so ordered.

A communication was received from L. L. Walton, Secretary, Pennsylvania State Pharmaceutical Board, announcing that the Board would require prospective pharmacy applicants who began their College course after July 1st, 1918, to present evidence of secondary education to the value of thirty counts. Mr. Cliffe moved that the Secretary be instructed to acknowledge receipt of the communication and state that the Philadelphia College of Pharmacy had already adopted the two year High School requirement, or

thirty academic counts, and same is to go into effect at the beginning of session 1918–19.

The Dean presented a thesis submitted by a member of class 1909 for the degree of Master in Pharmacy (in course) which, in accordance with the By-laws, was referred to the Committee on Examinations.

Communications were read from Professor William B. Day, Professor Fred. J. Wulling, and Mr. John K. Thum, expressing their appreciation of the honor conferred upon them by the College in awarding them the Honorary Degree of Master in Pharmacy.

The Dean announced the death of Professor C. Lewis Diehl and spoke of his work in the cause of Pharmacy and his loyalty to his Alma Mater and his adopted country. The Chairman referred to Mr. Diehl as the highest type of an American Pharmacist. Mr. England read a brief sketch of Mr. Diehl's activities in connection with pharmacy and moved that a Committee of three be appointed to draft resolutions upon his death and the Chairman appointed Messrs. Joseph W. England, Joseph P. Remington and E. M. Boring.

May 1st, 1917. Eleven members were present. The Committee on Instruction reported that a number of matters had been discussed at several recent meetings and the Committee had under consideration some very important matters and asked that an adjourned meeting of the Board be held to receive a report of the Committee.

The Committee referred to Dr. Roddy's absence at Fort Slocum, N. Y., and decided to have Mr. Gershenfeld complete the two lessons remaining in the Bacteriology course. The Treasurer, representing the Board, was appointed to take the diplomas to Dr. Roddy for his signature.

Mr. Cliffe moved that owing to the uncertainty existing, Dr. Roddy be granted a leave of absence for the balance of the session. It was so ordered.

The Committee on Examinations presented the name of Gilbert L. Harvey as having successfully passed the examination in the Food and Drug Course, and therefore was entitled to receive the Certificate of Proficiency in Chemistry. On motion, the Certificate was awarded. The Committee also presented the following names as those who had satisfactorily completed the Special Course in Bacteriology and were entitled to receive a Certificate: Pedro R. Carbo, William C. Forbes, James S. Horton, Acisclo Marxuach, Hermogenes C. Ramirez, Jose S. Reynes, Morton D. Stickle and

Donald B. Smith. On motion it was ordered that the Certificate in Bacteriology be awarded. The Committee reported as follows, relative to the status of students in the graduating class who had enlisted:

First, that all students who have been compelled to leave College on account of membership in the National Guard, previous to January 1st, 1917, be given a special examination in a manner that may be found by the Committee on Examinations to be best suited to the necessities of the situation, and that they be given due credit for any professional work performed during their service under the government.

Second, that all students who have enlisted or may enlist in the naval or military service of the United States, subsequent to January 1st, 1917, be given the same status upon their return as when they left College to enter service, except that due credit and advancement be given for any experience or instruction they may have obtained as pharmacists while in the government service. It was so ordered.

The Chairman advocated the adoption of a resolution asking the government to recognize pharmacists as professional men and not subject them to conscription in the ranks, as privates. Mr. England read a copy of a communication he had addressed to the Secretary of War, relative to establishing a Pharmaceutical Corps in the Army. The Chairman read a communication from Surgeon General Braisted, supplementing in a measure what Mr. England advocated. Mr. England then moved that the President of the College and the Chairman of the Board be authorized to forward such resolutions to the Federal Authorities. It was so ordered.

The Special Committee to prepare resolutions on the death of Prof. C. Lewis Diehl presented their report and on motion it was ordered that the resolutions be entered in the minutes and a copy sent to the family.

Mr. French proposed that some action be taken on the death of our Honorary Member, Frederick Gutekunst, and moved that a Committee of three be appointed to draft suitable resolutions. The Chairman subsequently appointed Howard B. French, A. W. Miller and C. A. Weidemann, as members of the Committee.

Mr. Cliffe, for the Committee on Examinations, stated it would be necessary to have a form of Certificate for students of the two year course who had not met the full requirements of the College

for a diploma and moved that the matter be referred to the Special Committee on Diplomas. It was so ordered.

May 15th, 1917. Fourteen members were present. The Committee on Instruction presented a lengthy report, giving a review of some of the conditions growing out of the changes in the courses of instruction. It also contained the annual reports of the Faculty, together with a number of suggested recommendations. The report was carefully considered and on motion the various recommendations were taken up seriatim.

1st. That the special rules on conduct and order, adopted by the Trustees relating to students, be printed in abstract and distributed to each student at the beginning of each term; and further, that the Dean address the students on the necessity of obeying the rules set forth.

2d. That two hours per week be assigned to Commercial Pharmacy.

3d. Prof. LaWall's recommendation to establish a student's conference of at least one hour per month for each class, as a part of the College curriculum.

4th. That Martin H. Gold be selected as the instructor in Botany and Pharmacognosy for the session of 1917–18.

5th. That hereafter the physical examination be made compulsory. Adopted. In this connection the Committee has appointed Doctors Lowe, Roddy and Heineberg to determine upon a feasible plan by which the medical examination can be systematically carried out.

6th. That Prof. Stroup be empowered to select an assistant to fill the vacancy caused by the resignation of Dr. Brewer.

7th. That Physics as a distinct branch be eliminated from the College curriculum.

8th. That the lecture work in Chemistry be divided into two parts, namely, General Chemistry and Pharmaceutical Chemistry. That Prof. Stroup retain General Chemistry and Prof. Sturmer be assigned Pharmaceutical Chemistry, and be given the title of Professor in Pharmaceutical Chemistry.

9th. That specimens as a separate branch of examination be eliminated and that hereafter the ratings in specimens in each department be included along with the rating in written work.

10th. That hereafter at least two of the scholarships be offered as awards to students in the second year class who have attained a high rating in the work of the first year.

11th. If the size of the second year class next year shall require three sections, that these be given the same lesson on alternate days of the same week. If not too large, however, it should be divided into two sections, working on alternate days.

12th. That a special course in Chemistry for Bacteriological students deficient in Chemistry be outlined for the catalogue.

13th. Professor Moerk's request that an additional assistant be allowed to help in the advanced instruction was also approved.

14th. Dr. Vanderkleed's request that "Chemical Control" as applied to Industrial Pharmacy be accepted as a more appropriate title than "Industrial Pharmacy" for the subjects covered by his lectures.

15th. That the teaching of scientific and technical German, applicable to the Post-graduate courses, be assigned to Professor Sturmer.

16th. Dr. Roddy having requested an assistant, but owing to Dr. Roddy's absence in the Medical Corps, and the uncertainties as to the effect of the war, action on this request of Dr. Roddy should be postponed. But if the necessity for an assistant arises, the Committee on Instruction should be authorized to select such an assistant.

Nominations being in order, Mr. Beringer nominated Prof. Freeman P. Stroup as Professor of General Chemistry and Professor Julius W. Sturmer as Professor of Pharmaceutical Chemistry. According to the By-laws these nominations lay over for one month for action.

Further recommendations by the Committee on Instruction were then considered, as follows:

1. It was recommended that in order to carry out existing agreements, the Phar.D. course should be continued, as advertised, for the next two years.

2. That the College continue the Ph.C. course as now provided by the By-laws.

3. That there be offered a Post-graduate course of one year, scheduled for three days per week, and a minimum of 700 hours of instruction. Any student who has successfully completed the two year Pharmacy course is eligible to this course.

The above recommendations were all approved.

In regard to the question of fees, which was considered by the Committee, it was on motion decided to advance the Laboratory fee to Fifteen Dollars, per annum. The fees for tuition were also

considered, but owing to the lateness of the hour, further consideration was postponed.

May 18th, 1917. Nine members were present, and regrets from eight members were noted. The Committee on Instruction read a supplementary report regarding fees, and after a very thorough discussion of the subject of fees and the methods of collection, the recommendation of the Committee was adopted.

The rules and regulations governing fees and general requirements for promotions and graduations would be published in full in the forthcoming announcement. On motion of Mr. Boring, a vote of thanks was extended to the Committee on Instruction for their valuable report.

The Committee on Examinations presented the name of Clarence H. Henderson as being entitled to the Certificate of Bacteriology. On motion the Certificate was granted.

May 25th, 1917. Eleven members were present. On motion of Mr. Cliffe, Professor J. W. Sturmer was invited to be present at the meeting of the Board.

The Committee on Examinations recommended Charles Elbert Hoffman, P.D. 1909, for the degree of Master in Pharmacy, Ph.M. (in course), for his thesis entitled "Topical Applications—the methods of preparation and means of dispensing for the treatment of diseases of the eye." see this JOURNAL, July, 1917. It was suggested that the degree be granted at the next Commencement. A ballot was then taken and being clear, the Chair declared Mr. Hoffman elected to receive the degree of Master in Pharmacy (in course).

The Committee on Examinations also presented the name of those who had satisfactorily passed the examinations and met all the requirements for graduation and were entitled to receive the diploma and certificates of the College. The number comprised 94 for the degree of Doctor in Pharmacy; 15 for the degree of Pharmaceutical Chemist (P.C.), old style, and 8 former students of the Medico-Chi who had completed their instruction at the Philadelphia College of Pharmacy, and were entitled to receive the degree of Pharmaceutical Chemist (Ph.C.).

A separate ballot was taken for each class and it being clear, they were elected to receive the degree.

The consideration of those entitled to receive the degree of Graduate in Pharmacy (Ph.G.) was postponed for the present.

Mr. Cliffe, for the Committee on Examinations, stated that the Rev. J. J. Joyce Moore had created a prize in memory of his father, J. B. Moore. The prize consists of a Troemner Agate Prescription Balance to be awarded to a member of the third year graduating class presenting the best thesis representing original work in the Department of Pharmacy. The Secretary was instructed to extend to the Rev. Dr. Moore the appreciation and thanks of the Board.

Mr. Cliffe then presented the report of prizes to be given to the graduates of the P.D. course. He also presented the name of Charles L. Coble as having taken the full course in Analytical Chemistry and entitled to receive the Certificate of Proficiency in Chemistry, and the name of Harry Philip Ottinger as having taken the Food and Drug Course and entitled to receive the Certificate of Proficiency in Food and Drug Analysis.

May 28th, 1917. Ten members were present. The Committee on Examinations presented the names of 93 candidates for the degree of Graduate in Pharmacy (Ph.G.), who had met all the requirements for graduation.

The Committee then presented the names of 38 students who had passed all the second year examinations and were, therefore, eligible to the degree of Ph.G. when the other graduation requirements shall have been met. They will receive a Certificate attesting to these facts.

Mr. Cliffe read a communication from Professor Kraemer, stating that owing to the merits of the theses of the Second year class he desired to present in addition to his prize to the Third year class a compound microscope for the best thesis in pharmacognosy in the Second year class. This was adopted. He then presented a report covering the award of prizes to students of the Ph.G. class, with the names of those who were to award the prizes. Mr. Cliffe also presented the form of Certificate to be given to those who had not complied with all the requirements.

In addition to the names presented by the Committee for diplomas, there were presented the names of those entitled to Certificates and whose names would appear on the Commencement program. Two to receive the Certificate of Proficiency in Chemistry. Two to receive the Certificate of Proficiency in the Food and Drug Course. Twenty-five to receive the Certificate in Bacteriology, one to receive the degree of Bachelor in Science, in Pharmacy and Chemistry.